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By: Omesh Singh
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PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D. C. 20231

Dear Sir:

In connection with the above-identified application filed herewith, please enter the following preliminary amendment:

IN THE CLAIMS

Please amend the following claims as indicated below. A marked-up copy of all claims is attached for reference.

3. (amended) A micro-structured optical fibre according to claim 1, wherein the refractive index of one or more of the core features is lower than the refractive index of the core material.

4. (amended) A micro-structured optical fibre according to claim 3, wherein the refractive index of a majority of the core features is lower than the refractive index of the core material.

6. (amended) A micro-structured optical fibre according to claim 1, wherein the refractive index of a majority of the core features is higher than the refractive index of the core material.

7. (amended) A micro-structured optical fibre according to claim 1, wherein the refractive index of one or more of the cladding features is lower than the refractive index of the cladding material.

8. (amended) A micro-structured optical fibre according to claim 7, wherein the refractive index of a majority of the cladding features is lower than the refractive index of the cladding material.

9. (amended) A micro-structured optical fibre according to claim 1, wherein the refractive index of one or more of the cladding features is higher than the refractive index of the cladding material.

10. (amended) A micro-structured optical fibre according to claim 1, wherein the refractive index of a majority of the cladding features is higher than the refractive index of the cladding material.

11. (amended) A micro-structured optical fibre according to claim 1, wherein said predetermined wavelength is selected from wavelength in the interval of 0.3 μm to 2 μm.

18. (amended) A micro-structured optical fibre according to claim 1, wherein said optical fibre is dimensioned to transmit light of said predetermined wavelength in a single mode of propagation.

21. (amended) A micro-structured optical fibre according to claim 1, wherein a part of or all of the core features have cross-sectional dimensions perpendicular to said axial direction being smaller than the cross-sectional dimensions of the cladding features.

22. (amended) A micro-structured optical fibre according to claim 1, wherein a part of or all of the core features have a centre-to-centre spacing being smaller than said predetermined wavelength.

24. (amended) A micro-structured optical fibre according to claim 1, wherein a part of or all of the core features have cross-sectional dimensions perpendicular to said axial direction being smaller than said predetermined wavelength.

28. (amended) A micro-structured optical fibre according to claim 26, wherein a part of or all of the core features have a cross-sectional dimension perpendicular to said axial direction being so large that the second-order mode of propagation is shifted to a wavelength of light being shorter or smaller than 1.5 μm, such as smaller than 1.3 μm, or such as smaller than 1.06 μm, such as smaller than 0.8 μm or such as smaller than 0.6 μm, such as smaller than 0.4 μm, such as smaller than 0.3 μm, or such as smaller than 0.2 μm.

29. (amended) A micro-structured optical fibre according to claim 24, wherein a part of or all of the core features have a cross-sectional dimension perpendicular to said axial direction larger than 0.2 μm, such as in the range of 0.2 μm to 0.4 μm, such as in the range of 0.4 μm to 1.0 μm, or such as in the range of 1.0 μm to 1.8 μm.

30. (amended) A micro-structured optical fibre according to claim 2, wherein the fibre has been dimensioned so that the value of the effective index of refraction of the cladding region, N_{cl}, is larger than the effective index of refraction of the core region, N_{co}, for wavelengths of lights below a shifting wavelength, said shifting wavelength having a value smaller than said predetermined wavelength.

32. (amended) A micro-structured optical fibre according to claim 1, wherein the core features in the cross section occupy in total a ratio F_c of the core region, and the cladding features in the cross section occupy in total a ratio F_i of the cladding region, and F_c is smaller than F_i.

33. (amended) A micro-structured optical fibre according to claim 1, wherein the cladding features are periodical features.

36. (amended) A micro-structured optical fibre according to claim 33, wherein the core features in the cross section occupy in total a ratio F_c of the core region, and the cladding features in the cross section occupy in total a ratio F_i of the cladding region, and F_c is larger than F_i.

37. (amended) A micro-structured optical fibre according to claim 1, wherein the core features have a centre-to-centre spacing being substantially equal to the centre-to-centre spacing of the cladding features.

38. (amended) A micro-structured optical fibre according to claim 1, wherein the core features have a centre-to-centre spacing being smaller than the centre-to-centre spacing of the cladding features.

39. (amended) A micro-structured optical fibre according to claim 1, wherein the number of core features is larger than 2, such as larger than 5, such as larger than 17.

40. (amended) A micro-structured optical fibre according to claim 1, wherein the number of core features is equal to 7 or equal to 13 or equal to 19.

41. (amended) A micro-structured optical fibre according to claim 1, wherein the refractive index of the core material is lower than the refractive index of the cladding material.

42. (amended) A micro-structured optical fibre according to claim 1, wherein the refractive index of the core material is substantially equal to the refractive index of the cladding material.

43. (amended) A micro-structured optical fibre according to claim 1, wherein the refractive index of the core material is higher than the refractive index of the cladding material.

45. (amended) A micro-structured optical fibre according to claim 1, wherein at least 60%, such as at least 80%, or such as all of the cladding features have a cross-sectional dimension perpendicular to said axial direction being larger than the wavelength of light guided by said fibre.

46. (amended) A micro-structured optical fibre according to claim 1, wherein the core region has a diameter larger than 2 μm.

48. (amended) A micro-structured optical fibre according to claim 1, wherein the cladding features have a diameter or a cross-sectional dimension being larger than 0.45 times the centre-to-centre spacing of said cladding features, such as larger than 0.6 times the cladding feature spacing, or such as larger than 0.9 times the cladding feature spacing.

49. (amended) A micro-structured optical fibre according to claim 1, wherein the cladding features occupy at least 25% of the cross-section of the cladding region, such as more than 40%, such as more than 50%, such as more than 60%, such as more than 70%, such as more than 80%.

50. (amended) A micro-structured optical fibre according to claim 1, wherein the core features occupy more than 5% of the cross-section of the core region, such as more than 10%, such as more than 25%, such as more than 50%, such as more than 75%.

51. (amended) A micro-structured optical fibre according to claim 1, wherein the core features are periodical features.

52. (amended) A micro-structured optical fibre according to claim 1, wherein the spacing of the core features and/or the cladding features are in the range of about 0.2 μm to 10 μm.

53. (amended) A micro-structured optical fibre according to claim 1, wherein the core material and/or the first cladding material is silica.

54. (amended) A micro-structured optical fibre according to claim 1, wherein one or more of the core features are rods.

56. (amended) A micro-structured optical fibre according to claim 1, wherein one or more of the cladding features are rods.

60. (amended) A micro-structured optical fibre according to claim 1, wherein one or more of the core features are voids.

61. (amended) A micro-structured optical fibre according to claim 1 or 56, wherein a majority or all of the core features are voids.

62. (amended) A micro-structured optical fibre according to claim 1, wherein one or more of the cladding features are voids.

63. (amended) A micro-structured optical fibre according to claim 1, wherein a majority or all of the cladding features are voids.

64. (amended) A micro-structured optical fibre according to claim 60, wherein the voids of the core region and/or the cladding region contain air, another gas, or a vacuum.

65. (amended) An article according to claim 60, wherein any of the core features and/or the cladding features are voids containing polymer(s), a material providing an increased third-order non-linearity, a photo-sensitive material, or a rare earth material.

70. (amended) An article according to claim 69, wherein the core region has an effective refractive index $N_{co,}$ the difference between N_{co} and N_i being a function of the wavelength of the guided light so that the effective index of the core region N_{co} is substantially equal to the effective index of the inner cladding region N_i at a wavelength referred to as the shifting wavelength, and wherein N_i is larger than N_o for operating wavelengths equal to or below said shifting wavelength.

74. (amended) An article according to claim 69, wherein the core region is a substantially solid core made of a core material and having an effective refractive index N_{co} being substantially equal to the refractive index of the core material.

75. (amended) An article according to claim 69, wherein the core region comprises a multitude of spaced apart core features being elongated in the axial direction and disposed in a core material.

76. (amended) An article according to claim 69, wherein all or at least part of the inner cladding features have a cross-sectional dimension being smaller than a cross-sectional dimension of the outer cladding features.

77. (amended) An article according to claim 69, wherein the centre-to-centre spacing between inner and outer cladding features is substantially identical.

78. (amended) An article according to claim 69, wherein the refractive index of the core material is lower than the refractive index of the inner cladding region material.

79. (amended) An article according to claim 69, wherein the inner cladding features in the cross-section occupy in total a ratio, F_i, of the inner cladding region and the outer cladding features in the cross-section occupy in total a ration, F_o, of the outer cladding region, and F_i is smaller than F_o.

80. (amended) An article according to claim 69, wherein all or at least part of the inner cladding features have a cross-sectional dimension being substantially identical to a cross-sectional dimension of all or at least part of the outer cladding features.

82. (amended) An article according to claim 69, wherein the number of inner cladding features is lower than 6, such as equal to 4, such as equal to 3, such as equal to 2.

83. (amended) An article according to claim 69, wherein the refractive index of the inner cladding material is substantially identical to or larger than the refractive index of the outer cladding material.

84. (amended) An article according to claim 69, wherein the refractive index of the inner cladding material is larger than the refractive index of the outer cladding material and the inner cladding features in the cross-section occupy an area, F_i, of the inner cladding region and the outer cladding features in the cross-section occupy an area, F_o, of the outer cladding region, and F_i is equal to or larger than F_o.

85. (amended) An article according to claim 69, wherein the refractive index of one or more of the inner cladding features is higher than the refractive index of the inner cladding material.

87. (amended) An article according to claim 69, wherein the refractive index of one or more of the inner cladding features is lower than the refractive index of the inner cladding material.

93. (amended) An article according to claim 90, wherein the inner cladding region comprises an inner cladding material with the refractive index of said inner cladding material being larger than the refractive index of the outer cladding features.

95. (amended) An article according to claim 69, wherein the refractive index of one or more of the outer cladding features is higher than the refractive index of the outer cladding material.

97. (amended) An article according to claim 69, wherein the refractive index of one or more of the outer cladding features is lower than the refractive index of the outer cladding material.

99. (amended) An article according to claim 75 or 90, wherein the refractive index of one or more of the core features is higher than the refractive index of the core material.

100. (amended) An article according to claim 75 or 90, wherein the refractive index of one or more of the core features is lower than the refractive index of the core material.

101. (amended) An article according to claim 66 or 79, wherein the refractive index of the core material is

102. (amended) An article according to claim 66, wherein the refractive index of the core material is substantially identical to the refractive index of the outer cladding region material.

103. (amended) An article according to claim 75, wherein the core features have a cross-sectional dimension that is smaller than a cross-sectional dimension of the inner cladding features.

104. (amended) An article according to claim 75, wherein the core features have a centre-to-centre spacing that is smaller than the centre-to-centre spacing of the inner cladding features.

105. (amended) An article according to claim 68, wherein the outer cladding features occupy more than 30% of the cross-section of the outer cladding region, such as more than 40%, such as more than 50%, such as more than 60%, such as more than 70%, such as more than 80%.

106. (amended) An article according to claim 67, wherein the inner and/or outer cladding features are periodically disposed.

107. (amended) An article according to claim 75 or 90, wherein the core features are periodical core features.

108. (amended) An article according to claim 66, wherein the core has a diameter larger than 2 μm.

110. (amended) An article according to claim 66, wherein the inner and/or outer cladding features have a spacing in the range of about 0.1 to 10 times the wavelength of any light guided through the fibre, such as in the range of about 0.5 to 1, such as in the range of about 1 to 2, such as in the range of about 2 to 5, such as in the range of about 5 to 10.

111. (amended) An article according to claim 75 or 90, wherein the core features have a spacing in the range of about 0.1 to 10 times the wavelength of any light guided through the fibre, such as in the range of about 0.5 to 1, such as in the range of about 1 to 2, such as in the range of about 2 to 5, such as in the range of about 5 to 10.

112. (amended) An article according to claim 75 or 90, wherein the core features have a spacing in the range of about 0.1 μm to 10 μm, such as in the range of about 0.5 μm to 1 μm, such as in the range of about 1 μm to 2 μm, such as in the range of about 2 μm to 5 μm, such as in the range of about 5 μm to 10 μm.

113. (amended) An article according to claim 75 or 90, wherein one or more of the core features are voids.

115. (amended) An article according to claim 67 or 95, wherein one or more of the inner cladding features are voids.

117. (amended) An article according to claim 68, wherein one or more of the outer cladding features are voids.

119. (amended) An article according to claim 113, wherein one or more of the core features and/or the cladding features are voids containing air, another gas, or a vacuum.

120. (amended) An article according to claim 75, wherein one or more of the core features are rods.

122. (amended) An article according to claim 67, wherein one or more of the inner cladding features are rods.

124. (amended) An article according to claim 68, wherein one or more of the outer cladding features are rods.

126. (amended) An article according to claim 113, wherein one or more of the core features and/or the cladding features are voids containing polymer(s), a material providing an increased third-order non-linearity, a photo-sensitive material, or a rare earth material.

127. (amended) An article according to claim 1, wherein the fibre guides light at a predetermined wavelength in a single mode.

132. (amended) An article according to claim 131, wherein N_{co} is larger than N_1 for all wavelengths of optical radiation which can be guided by the micro-structured fibre.

133. (amended) An article according to claim 131, wherein the effective refractive index difference between the core region and the inner cladding region is greater than about 5%.

134. (amended) An article according to claim 131, wherein the core region and the inner cladding region are mutually adapted so that the micro-structured fibre exhibits a substantially

zero dispersion or near-zero dispersion wavelength within the range of 1.2 μm to 1.8 μm, such as within the range of 1.48 μm to 1.62 μm, such as within the range of 1.52 μm to 1.58 μm.

135. (amended) An article according to claim 131, wherein the centre to centre spacing or pitch of the inner cladding features, Λ_i, is around or below 2 μm, such as around or below 1.5 μm, such as around 1.4 μm, or in the range of 1 μm to 2 μm, such as in the range of 1 μm to 1.5 μm.

136. (amended) An article according to claim 131, wherein the number of inner cladding features is higher than or equal to 6.

138. (amended) An article according to claim 131, wherein the centre to centre spacing or pitch of the outer cladding features, Λ_o, is substantially equal to the centre to centre spacing or pitch of the inner cladding features, Λ_i.

139. (amended) An article according to claim 131, wherein all or at least part of the inner cladding features have a diameter or cross-sectional dimension being substantially identical to a diameter or cross-sectional dimension of all or at least part of the outer cladding features.

141. (amended) An article according to claim 139, wherein the centre to centre spacing between inner cladding features Λ_i is larger than the centre to centre spacing between outer cladding features Λ_o.

145. (amended) An article according to claim 131, wherein the centre to centre spacing or pitch of the outer cladding features, Λ_o, is around or below 2 μm, such as around or below 1.5 μm, such as around 1.4 μm, or in the range of 1 μm to 2 μm, such as in the range of 1 μm to 1.5 μm.

147. (amended) An article according to claim 131, wherein the core has a diameter around or below 4 μm, such as around or below 3.6 μm, such as around or below 2 μm, such as around or below 1.5 μm.

148. (amended) An article according to claim 131, wherein the refractive index of the core region is varying along the diameter of the core region so that an inner and/or a central portion of the core has a higher refractive index than an outer portion of the core.

150. (amended) An article according to claim 148, wherein the inner and/or central portion of the core has a higher refractive index than the refractive index of the inner cladding material and/or the outer cladding material.

151. (amended) An article according to claim 131, wherein at least part of the core region has a refractive index being substantially identical to the refractive index of the inner and/or outer cladding region material.

152. (amended) An article according to claim 131, wherein at least part of the core region has a refractive index being larger than the refractive index of the inner and/or outer cladding region material.

153. (amended) An article according to claim 131, wherein at least part of the core region has a lower refractive index than the refractive index of the inner cladding material and/or the outer cladding material.

154. (amended) An article according to claim 131, wherein the inner cladding features are voids and/or rods having a lower refractive index than the inner cladding material.

155. (amended) An article according to claim 131, wherein the outer cladding features are voids and/or rods having a lower refractive index than the outer cladding material.

156. (amended) An article according to claim 131, wherein all or at least part of the inner cladding features have a cross-sectional dimension being smaller than a cross-sectional dimension of the outer cladding features.

157. (amended) An article according to claim 131, wherein the refractive index of the inner cladding material is substantially identical to the refractive index of the outer cladding material.

158. (amended) An article according to claim 131, wherein the inner cladding features in the cross-section occupy in total a ratio, F_i, of the inner cladding region and the outer cladding features in the cross-section occupy in total a ration, F_o, of the outer cladding region, and F_i is smaller than F_o.

159. (amended) An article according to claim 131, wherein one or more of the cladding features are voids containing air, another gas, or a vacuum.

160. (amended) An article according to claim 131, wherein one or more of the cladding features are voids containing polymer(s), a material providing an increased third-order non-linearity, a photo-sensitive material, or a rare earth material.

161. (amended) An article according to claim 131, wherein the core region and/or the cladding regions comprise silica.

162. (amended) An article according to claim 131, wherein the core and/or any of the cladding materials contains polymer(s), are material(s) providing an increased third-order non-linearity, are photo-sensitive material(s), or are rare earth material(s).

163. (amended) An article according to claim 131, wherein said fibre is dimensioned to guide light of predetermined wavelength in two substantially, non-degenerate polarization states.

164. (amended) An article according to claim 131, wherein the fibre is characterized by a birefringence of at least 10^{-5}, such as of at least 10^{-4}, such of as at least 10^{-3}.

165. (amended) An article according to claim 131, wherein the core region has a substantially two-fold symmetry, obtained from arrangement of the core features in a substantially two-fold symmetric manner.

166. (amended) An article according to claim 131, wherein the core region contains core features with a non-circular symmetric shape in the fibre cross-section.

167. (amended) An article according to claim 131, wherein the shape of the core region deviates substantially from a circular shape in the fibre cross-section.

168. (amended) An article according to claim 131, wherein shape of the core region deviates substantially from a quadratic shape, a hexagonal shape, or a higher order polynomial shape in the fibre cross-section.

169. (amended) An article according to claim 131, wherein shape of the core region is substantially rectangular in the fibre cross-section.

170. (amended) An article according to claim 131, wherein the core region and/or cladding region has substantially a 180 degree rotational symmetry in the fibre cross-section.

171. (amended) An article according to claim 131, wherein shape of the core region is essentially circular or elliptical.

REMARKS

The above preliminary amendment is made to remove multiple dependencies from the above-listed claims.

Applicants respectfully request that the preliminary amendment described herein be entered into the record prior to calculation of the filing fee and prior to examination and consideration of the above-identified application.

If a telephone conference would be helpful in resolving any issues concerning this communication, please contact Applicants' primary attorney-of record, John J. Gresens (Reg. No. 33,112), at (612) 371.5265.

Respectfully submitted,

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Dated: <u>20 July 2001</u>

By ____________________
John J. Gresens
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JJG/kjr

MARKED UP COPY OF CLAIMS

3. A micro-structured optical fibre according to claim 1[or 2], wherein the refractive index of one or more of the core features is lower than the refractive index of the core material.

4. A micro-structured optical fibre according to claim 3, wherein the refractive index of a majority [or all]of the core features is lower than the refractive index of the core material.

6. A micro-structured optical fibre according to claim 1[or 2], wherein the refractive index of a majority [or all]of the core features is higher than the refractive index of the core material.

7. A micro-structured optical fibre according to [any of the]claim[s] 1[- 6], wherein the refractive index of one or more of the cladding features is lower than the refractive index of the cladding material.

8. A micro-structured optical fibre according to claim 7, wherein the refractive index of a majority [or all]of the cladding features is lower than the refractive index of the cladding material.

9. A micro-structured optical fibre according to [any of]claim[s] 1[-7], wherein the refractive index of one or more of the cladding features is higher than the refractive index of the cladding material.

10. A micro-structured optical fibre according to claim 1[-6], wherein the refractive index of a majority [or all]of the cladding features is higher than the refractive index of the cladding material.

11. A micro-structured optical fibre according to [any of the]claim[s] 1[-10], wherein said predetermined wavelength is selected from wavelength in the interval of 0.3 μm to 2 μm.

18. A micro-structured optical fibre according to [any of the]claim[s] 1[-17], wherein said optical fibre is dimensioned to transmit light of said predetermined wavelength in a single mode of propagation.

21. A micro-structured optical fibre according to [any of the]claim[s] 1[-20], wherein a part of or all of the core features have cross-sectional dimensions perpendicular to said axial direction being smaller than the cross-sectional dimensions of the cladding features.

22. A micro-structured optical fibre according to [any of the]claim[s] 1[-21], wherein a part of or all of the core features have a centre-to-centre spacing being smaller than said predetermined wavelength.

24. A micro-structured optical fibre according to [any of the]claim[s] 1[-23], wherein a part of or all of the core features have cross-sectional dimensions perpendicular to said axial direction being smaller than said predetermined wavelength.

28. A micro-structured optical fibre according to claim 26[or 27], wherein a part of or all of the core features have a cross-sectional dimension perpendicular to said axial direction being so large that the second-order mode of propagation is shifted to a wavelength of light being shorter or smaller than 1.5 μm, such as smaller than 1.3 μm, or such as smaller than 1.06 μm, such as smaller than 0.8 μm or such as smaller than 0.6 μm, such as smaller than 0.4 μm, such as smaller than 0.3 μm, or such as smaller than 0.2 μm.

29. A micro-structured optical fibre according to [any of the]claim[s] 24[-28], wherein a part of or all of the core features have a cross-sectional dimension perpendicular to said axial direction larger than 0.2 μm, such as in the range of 0.2 μm to 0.4 μm, such as in the range of 0.4 μm to 1.0 μm, or such as in the range of 1.0 μm to 1.8 μm.

30. A micro-structured optical fibre according to [any of the]claim[s] 2[-29], wherein the fibre has been dimensioned so that the value of the effective index of refraction of the cladding region, N_{cl}, is larger than the effective index of refraction of the core region, N_{co}, for wavelengths of lights below a shifting wavelength, said shifting wavelength having a value smaller than said predetermined wavelength.

32. A micro-structured optical fibre according to [any of the]claim[s] 1[-31], wherein the core features in the cross section occupy in total a ratio F_c of the core region, and the cladding features in the cross section occupy in total a ratio F_i of the cladding region, and F_c is smaller than F_i.

33. A micro-structured optical fibre according to claim 1[or any of the claims 2-21], wherein the cladding features are periodical features.

36. A micro-structured optical fibre according to [any of the]claim[s] 33[-35], wherein the core features in the cross section occupy in total a ratio F_c of the core region, and the cladding features in the cross section occupy in total a ratio F_i of the cladding region, and F_c is larger than F_i.

37. A micro-structured optical fibre according to [any of the preceding]claim[s] 1, wherein the core features have a centre-to-centre spacing being substantially equal to the centre-to-centre spacing of the cladding features.

38. A micro-structured optical fibre according to [any of the]claim[s] 1[-36], wherein the core features have a centre-to-centre spacing being smaller than the centre-to-centre spacing of the cladding features.

39. A micro-structured optical fibre according to [any of the preceding]claim[s] 1, wherein the number of core features is larger than 2, such as larger than 5, such as larger than 17.

40. A micro-structured optical fibre according to [any of the]claim[s] 1[-38], wherein the number of core features is equal to 7 or equal to 13 or equal to 19.

41. A micro-structured optical fibre according to [any of the]claim[s] 1[-40], wherein the refractive index of the core material is lower than the refractive index of the cladding material.

42. A micro-structured optical fibre according to [any of the]claim[s] 1[-40], wherein the refractive index of the core material is substantially equal to the refractive index of the cladding material.

43. A micro-structured optical fibre according to [any of the]claim[s] 1[-40], wherein the refractive index of the core material is higher than the refractive index of the cladding material.

45. A micro-structured optical fibre according to [any of the]claim[s] 1[-44], wherein at least 60%, such as at least 80%, or such as all of the cladding features have a cross-sectional dimension perpendicular to said axial direction being larger than the wavelength of light guided by said fibre.

46. A micro-structured optical fibre according to [any of the preceding]claim[s] 1, wherein the core region has a diameter larger than 2 μm.

48. A micro-structured optical fibre according to [any of the preceding]claim[s] 1, wherein the cladding features have a diameter or a cross-sectional dimension being larger than 0.45 times the centre-to-centre spacing of said cladding features, such as larger than 0.6 times the cladding feature spacing, or such as larger than 0.9 times the cladding feature spacing.

49. A micro-structured optical fibre according to [any of the preceding]claim[s] 1, wherein the cladding features occupy at least 25% of the cross-section of the cladding region, such as more than 40%, such as more than 50%, such as more than 60%, such as more than 70%, such as more than 80%.

50. A micro-structured optical fibre according to [any of the preceding]claim[s] 1, wherein the core features occupy more than 5% of the cross-section of the core region, such as more than 10%, such as more than 25%, such as more than 50%, such as more than 75%.

51. A micro-structured optical fibre according to [any of the preceding]claim[s] 1, wherein the core features are periodical features.

52. A micro-structured optical fibre according to [any of the preceding]claim[s] 1, wherein the spacing of the core features and/or the cladding features are in the range of about 0.2 μm to 10 μm.

53. A micro-structured optical fibre according to [any of the preceding]claim[s] 1, wherein the core material and/or the first cladding material is silica.

54. A micro-structured optical fibre according to [any of the preceding]claim[s] 1, wherein one or more of the core features are rods.

56. A micro-structured optical fibre according to [any of the preceding]claim[s] 1, wherein one or more of the cladding features are rods.

60. A micro-structured optical fibre according to [any of the preceding]claim[s] 1, wherein one or more of the core features are voids.

61. A micro-structured optical fibre according to [any of the]claim[s] 1[-54] or 56[-60], wherein a majority or all of the core features are voids.

62. A micro-structured optical fibre according to [any of the preceding]claim[s] 1, wherein one or more of the cladding features are voids.

63. A micro-structured optical fibre according to [any of the]claim[s] 1[-56 or 58-62], wherein a majority or all of the cladding features are voids.

64. A micro-structured optical fibre according to [any of the]claim[s] 60[-63], wherein the voids of the core region and/or the cladding region contain air, another gas, or a vacuum.

65. An article according to [any of the]claim[s] 60[-63], wherein any of the core features and/or the cladding features are voids containing polymer(s), a material providing an increased third-order non-linearity, a photo-sensitive material, or a rare earth material.

70. An article according to claim [68 or]69, wherein the core region has an effective refractive index $N_{co,}$ the difference between N_{co} and N_i being a function of the wavelength of the guided light so that the effective index of the core region N_{co} is substantially equal to the effective index of the inner cladding region N_i at a wavelength referred to as the shifting wavelength, and wherein N_1 is larger than N_o for operating wavelengths equal to or below said shifting wavelength.

74. An article according to [any of the]claim[s] [67-73]69, wherein the core region is a substantially solid core made of a core material and having an effective refractive index N_{co} being substantially equal to the refractive index of the core material.

75. An article according to [any of the]claim[s] [67-73]69, wherein the core region comprises a multitude of spaced apart core features being elongated in the axial direction and disposed in a core material.

76. An article according to [any of the]claim[s] [68-75]69, wherein all or at least part of the inner cladding features have a cross-sectional dimension being smaller than a cross-sectional dimension of the outer cladding features.

77. An article according to [any of the]claim[s] [68-76]69, wherein the centre-to-centre spacing between inner and outer cladding features is substantially identical.

78. An article according to [any of the]claim[s] [67-77]69, wherein the refractive index of the core material is lower than the refractive index of the inner cladding region material.

79. An article according to [any of the]claim[s] [68-78]69, wherein the inner cladding features in the cross-section occupy in total a ratio, F_i, of the inner cladding region and the outer cladding features in the cross-section occupy in total a ration, F_o, of the outer cladding region, and F_i is smaller than F_o.

80. An article according to [any of the]claim[s] [68-75 or 79]69, wherein all or at least part of the inner cladding features have a cross-sectional dimension being substantially identical to a cross-sectional dimension of all or at least part of the outer cladding features.

82. An article according to [any of the]claim[s] [68-81]69, wherein the number of inner cladding features is lower than 6, such as equal to 4, such as equal to 3, such as equal to 2.

83. An article according to [any of the]claim[s] [67-82]69, wherein the refractive index of the inner cladding material is substantially identical to or larger than the refractive index of the outer cladding material.

84. An article according to [any of the]claim[s] [68-75]69, wherein the refractive index of the inner cladding material is larger than the refractive index of the outer cladding material and the inner cladding features in the cross-section occupy an area, F_i, of the inner cladding

region and the outer cladding features in the cross-section occupy an area, F_o, of the outer cladding region, and F_i is equal to or larger than F_o.

85. An article according to [any of the]claim[s] [67-84]69, wherein the refractive index of one or more of the inner cladding features is higher than the refractive index of the inner cladding material.

87. An article according to [any of the]claim[s] [67-84]69, wherein the refractive index of one or more of the inner cladding features is lower than the refractive index of the inner cladding material.

93. An article according to [any of the]claim[s] 90[-92], wherein the inner cladding region comprises an inner cladding material with the refractive index of said inner cladding material being larger than the refractive index of the outer cladding features.

95. An article according to [any of the]claim[s] [68-94]69, wherein the refractive index of one or more of the outer cladding features is higher than the refractive index of the outer cladding material.

97. An article according to [any of the]claim[s] [68-94]69, wherein the refractive index of one or more of the outer cladding features is lower than the refractive index of the outer cladding material.

99. An article according to [any of the]claim[s] 75[-88] or 90[-98], wherein the refractive index of one or more of the core features is higher than the refractive index of the core material.

100. An article according to [any of the]claim[s] 75[-88] or 90[-98], wherein the refractive index of one or more of the core features is lower than the refractive index of the core material.

101. An article according to [any of the]claim[s] 66[-77] or 79[-100], wherein the refractive index of the core material is

102. An article according to [any of the]claim[s] 66[-101], wherein the refractive index of the core material is substantially identical to the refractive index of the outer cladding region material.

103. An article according to [any of the]claim[s] 75[-102], wherein the core features have a cross-sectional dimension that is smaller than a cross-sectional dimension of the inner cladding features.

104. An article according to [any of the]claim[s] 75[-103], wherein the core features have a centre-to-centre spacing that is smaller than the centre-to-centre spacing of the inner cladding features.

105. An article according to [any of the]claim[s] 68[-104], wherein the outer cladding features occupy more than 30% of the cross-section of the outer cladding region, such as more than 40%, such as more than 50%, such as more than 60%, such as more than 70%, such as more than 80%.

106. An article according to [any of the]claim[s] 67[-105], wherein the inner and/or outer cladding features are periodically disposed.

107. An article according to [any of the]claim[s] 75-88] or 90[-106], wherein the core features are periodical core features.

108. An article according to [any of the]claim[s] 66[-107], wherein the core has a diameter larger than 2 μm.

110. An article according to [any of the]claim[s] 66[-109], wherein the inner and/or outer cladding features have a spacing in the range of about 0.1 to 10 times the wavelength of any light guided through the fibre, such as in the range of about 0.5 to 1, such as in the range of about 1 to 2, such as in the range of about 2 to 5, such as in the range of about 5 to 10.

111. An article according to [any of the]claim[s] 75[-88] or 90[-110], wherein the core features have a spacing in the range of about 0.1 to 10 times the wavelength of any light guided through the fibre, such as in the range of about 0.5 to 1, such as in the range of about 1 to 2, such as in the range of about 2 to 5, such as in the range of about 5 to 10.

112. An article according to [any of the]claim[s] 75[-88] or 90[-111], wherein the core features have a spacing in the range of about 0.1 μm to 10 μm, such as in the range of about 0.5 μm to 1 μm, such as in the range of about 1 μm to 2 μm, such as in the range of about 2 μm to 5 μm, such as in the range of about 5 μm to 10 μm.

113. An article according to [any of the]claim[s] 75[-88] or 90[-112], wherein one or more of the core features are voids.

115. An article according to [any of the]claim[s] 67[-88] or 95[-114], wherein one or more of the inner cladding features are voids.

117. An article according to [any of the]claim[s] 68[-116], wherein one or more of the outer cladding features are voids.

119. An article according to [any of the]claim[s] 113[-118], wherein one or more of the core features and/or the cladding features are voids containing air, another gas, or a vacuum.

120. An article according to [any of the]claim[s] 75[-88 or 90-113 or 115-119], wherein one or more of the core features are rods.

122. An article according to [any of the]claim[s] 67[-88 or 95-115 or 117-121], wherein one or more of the inner cladding features are rods.

124. An article according to [any of the]claim[s] 68[-117 or 119-123], wherein one or more of the outer cladding features are rods.

126. An article according to [any of the]claim[s] 113[-125], wherein one or more of the core features and/or the cladding features are voids containing polymer(s), a material providing an increased third-order non-linearity, a photo-sensitive material, or a rare earth material.

127. An article according to [any of the preceding]claim[s] 1, wherein the fibre guides light at a predetermined wavelength in a single mode.

132. An article according to claim [130 or]131, wherein N_{co} is larger than N_i for all wavelengths of optical radiation which can be guided by the micro-structured fibre.

133. An article according to [any of the]claim[s] [130-132]131, wherein the effective refractive index difference between the core region and the inner cladding region is greater than about 5%.

134. An article according to [any of the]claim[s] [130-133]131, wherein the core region and the inner cladding region are mutually adapted so that the micro-structured fibre exhibits a substantially zero dispersion or near-zero dispersion wavelength within the range of 1.2 μm to 1.8 μm, such as within the range of 1.48 μm to 1.62 μm, such as within the range of 1.52 μm to 1.58 μm.

135. An article according to [any of the]claim[s] [130-134]131, wherein the centre to centre spacing or pitch of the inner cladding features, Λ_i, is around or below 2 μm, such as

around or below 1.5 μm, such as around 1.4 μm, or in the range of 1 μm to 2 μm, such as in the range of 1 μm to 1.5 μm.

136. An article according to [any of the]claim[s] [130-137]131, wherein the number of inner cladding features is higher than or equal to 6.

138. An article according to [any of the]claim[s] [130-137]131, wherein the centre to centre spacing or pitch of the outer cladding features, Λ_o, is substantially equal to the centre to centre spacing or pitch of the inner cladding features, Λ_i.

139. An article according to [any of the]claim[s] [130-135]131, wherein all or at least part of the inner cladding features have a diameter or cross-sectional dimension being substantially identical to a diameter or cross-sectional dimension of all or at least part of the outer cladding features.

141. An article according to claim 139[or 140], wherein the centre to centre spacing between inner cladding features Λ_i is larger than the centre to centre spacing between outer cladding features Λ_o.

145. An article according to [any of the]claim[s] [130-144]131, wherein the centre to centre spacing or pitch of the outer cladding features, Λ_o, is around or below 2 μm, such as around or below 1.5 μm, such as around 1.4 μm, or in the range of 1 μm to 2 μm, such as in the range of 1 μm to 1.5 μm.

147. An article according to [any of the]claim[s] [130-146]131, wherein the core has a diameter around or below 4 μm, such as around or below 3.6 μm, such as around or below 2 μm, such as around or below 1.5 μm.

148. An article according to [any of the]claim[s] [130-147]131, wherein the refractive index of the core region is varying along the diameter of the core region so that an inner and/or a central portion of the core has a higher refractive index than an outer portion of the core.

150. An article according to claim 148[or 149], wherein the inner and/or central portion of the core has a higher refractive index than the refractive index of the inner cladding material and/or the outer cladding material.

151. An article according to [any of the]claim[s] [130-150]131, wherein at least part of the core region has a refractive index being substantially identical to the refractive index of the inner and/or outer cladding region material.

152. An article according to [any of the]claim[s] [130-150]131, wherein at least part of the core region has a refractive index being larger than the refractive index of the inner and/or outer cladding region material.

153. An article according to [any of the]claim[s] [130-150]131, wherein at least part of the core region has a lower refractive index than the refractive index of the inner cladding material and/or the outer cladding material.

154. An article according to [any of the]claim[s] [130-153]131, wherein the inner cladding features are voids and/or rods having a lower refractive index than the inner cladding material.

155. An article according to [any of the]claim[s] [130-154]131, wherein the outer cladding features are voids and/or rods having a lower refractive index than the outer cladding material.

156. An article according to [any of the]claim[s] [130-138 or 140-155]131, wherein all or at least part of the inner cladding features have a cross-sectional dimension being smaller than a cross-sectional dimension of the outer cladding features.

157. An article according to [any of the]claim[s] [130-156]131, wherein the refractive index of the inner cladding material is substantially identical to the refractive index of the outer cladding material.

158. An article according to [any of the]claim[s] [130-157]131, wherein the inner cladding features in the cross-section occupy in total a ratio, F_i, of the inner cladding region and the outer cladding features in the cross-section occupy in total a ration, F_o, of the outer cladding region, and F_i is smaller than F_o.

159. An article according to [any of the]claim[s] [130-158]131, wherein one or more of the cladding features are voids containing air, another gas, or a vacuum.

160. An article according to [any of the]claim[s] [130-158]131, wherein one or more of the cladding features are voids containing polymer(s), a material providing an increased third-order non-linearity, a photo-sensitive material, or a rare earth material.

161. An article according to [any of the preceding]claim[s] 131, wherein the core region and/or the cladding regions comprise silica.

162. An article according to [any of the preceding]claim[s] 131, wherein the core and/or any of the cladding materials contains polymer(s), are material(s) providing an increased third-order non-linearity, are photo-sensitive material(s), or are rare earth material(s).

163. An article according to [any of the preceding]claim[s] 131, wherein said fibre is dimensioned to guide light of predetermined wavelength in two substantially, non-degenerate polarization states.

164. An article according to [any of the preceding]claim[s] 131, wherein the fibre is characterized by a birefringence of at least 10^{-5}, such as of at least 10^{-4}, such of as at least 10^{-3}.

165. An article according to [any of the preceding]claim[s] 131, wherein the core region has a substantially two-fold symmetry, obtained from arrangement of the core features in a substantially two-fold symmetric manner.

166. An article according to [any of the preceding]claim[s] 131, wherein the core region contains core features with a non-circular symmetric shape in the fibre cross-section.

167. An article according to [any of the preceding]claim[s] 131, wherein the shape of the core region deviates substantially from a circular shape in the fibre cross-section.

168. An article according to [any of the preceding]claim[s] 131, wherein shape of the core region deviates substantially from a quadratic shape, a hexagonal shape, or a higher order polynomial shape in the fibre cross-section.

169. An article according to [any of the preceding]claim[s] 131, wherein shape of the core region is substantially rectangular in the fibre cross-section.

170. An article according to [any of the preceding]claim[s] 131, wherein the core region and/or cladding region has substantially a 180 degree rotational symmetry in the fibre cross-section.

171. An article according to [any of the preceding]claim[s] 131, wherein shape of the core region is essentially circular or elliptical.